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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	10/771,576
Filing Date	February 4, 2004
First Named Inventor	Koo et al.
Art Unit	2681
Examiner Name	Not Yet Known
Attorney Docket Number	I-2-0408.2US

Total Number of Pages in This Submission

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Response to Missing Parts/ Incomplete Application
  - ☐ Response to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
- ☐ After Allowance communication to Technology Center (TC)
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☒ Other Enclosure(s) (please Identify below):

Communication Re Favorable IPER, copy of approved claims as published and copy of International Preliminary Examination Report

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	C. Frederick Koenig III Volpe and Koenig, P.C.	Reg. No. 29,662
Signature		
Date	6/28/04	

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below.

Typed or printed name	C. Frederick Koenig III		
Signature		Date	6/28/04

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
	Koo et al.
Application No.:	10/771,576
Confirmation No.:	3803
Filed:	February 4, 2004
For:	METHOD AND SYSTEM FOR ADJUSTING DOWNLINK OUTER LOOP POWER TO CONTROL TARGET SIR
Group:	2681
Examiner:	Not Yet Known

Our File: I-2-0408.2US

Date: June 28, 2004

COMMUNICATION RE FAVORABLE IPER BY IPEA/US IN CORRESPONDING INTERNATIONAL APPLICATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This communication is to advise the Examiner of the favorable International Preliminary Examination Report (IPER) issued by the United States Patent and Trademark Office acting as International Preliminary Examination Authority in a corresponding international application. A copy of the IPER is enclosed.

Approved PCT claims 27-44 correspond to claims 1-18 in this U.S. application. A copy of the approved claims as published is also enclosed.

In view of the fact that PCT claims have all been found to meet the international standards of patentability, prompt examination and allowance are respectfully requested.

Respectfully submitted,

Koo et al.

By _____
C. Frederick Koenig III
Registration No. 29,662
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Volpe and Koenig, P.C.
United Plaza, Suite 1600
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CFK/rw
Enclosures (2)

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
JOHN C. DONCH, JR.
VOLPE AND KOENIG, P.C.
UNITED PLAZA, SUITE 1600
30 S. 17TH STREET
PHILADELPHIA, PA 19103

PCT

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of Mailing (*day/month/year*)	09 APR 2004
Applicant's or agent's file reference I-2-0408.1WO	**IMPORTANT NOTIFICATION**

International application No.	International filing date (*day/month/year*)	Priority date (*day/month/year*)
PCT/US03/28412	11 September 2003 (11.09.2003)	12 September 2002 (12.09.2002)

Applicant

INTERDIGITAL TECHNOLOGY CORPORATION

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer Edan Orgad Telephone No. 703-305-4223

Form PCT/IPEA/416 (July 1992)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference I-2-0408.1WO	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/US03/28412	International filing date *(day/month/year)* 11 September 2003 (11.09.2003)	Priority date *(day/month/year)* 12 September 2002 (12.09.2002)
International Patent Classification (IPC) or national classification and IPC IPC(7): H04Q 7/00; H04B 7/00 and US Cl.: 455/522, 127.1, 127.2, 127.6, 69, 452.1, 67.13; 370/280, 294, 276, 252		
Applicant INTERDIGITAL TECHNOLOGY CORPORATION		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 0 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of report with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand 12 February 2004 (12.02.2004)	Date of completion of this report 30 March 2004 (30.03.2004)
Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer Edan Orgad Telephone No. 703-305-4223

Form PCT/IPEA/409 (cover sheet)(July 1998)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US03/28412

I. Basis of the report

1. With regard to the elements of the international application:*

☐ the international application as originally filed.

☒ the description:
pages 1-11 as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____.

☒ the claims:
pages 12-16a-e , as originally filed
pages NONE , as amended (together with any statement) under Article 19
pages NONE , filed with the demand
pages NONE , filed with the letter of _____.

☒ the drawings:
pages 1-6 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____.

☐ the sequence listing part of the description:
pages NONE , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____.

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination(under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in printed form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages NONE

☐ the claims, Nos. NONE

☐ the drawings, sheets/~~fig~~ NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

** Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*
*** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US03/28412

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims 1-44	YES
	Claims NONE	NO
Inventive Step (IS)	Claims 1-44	YES
	Claims NONE	NO
Industrial Applicability (IA)	Claims 1-44	YES
	Claims NONE	NO

2. CITATIONS AND EXPLANATIONS

Claims 1-44 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest controlling transmission power in order to maintain a received SIR as close as possible to a target SIR by using outer loop power control process to set a target SIR for each coded composite transport channel (CCTrCH) based on the required target block error rate. More specifically the process adjusts a SIR step size parameter to maximize the convergence speed of the process. Although, prior art of record, specifically Hamalainen (US 2003/0021243) does suggest the received quality is maintained as close as possible to a target quality based on block error rate (BLER), particularly when a target BLER is converted to an initial target SIR where an error may occur due to a channel condition mismatch, since the target SIR required for the target BLER varies with channel conditions. However, Hamalainen's teachings do not comply with PCT rules as "X" or "Y" references but rather have an "E" date and therefore do comply as prior art.

---------- NEW CITATIONS ----------

NONE

CLAIMS

What is claimed is:

1. In a wireless communication system, a method of controlling transmission power to adjust the step size of a target signal-to-interference ratio (SIR) to compensate for channel conditions affected by block error rate (BLER), the method comprising:

in a settling state, initializing a plurality of parameters including (i) an inner loop settling time, (ii) a steady state step size, (iii) a transient state step size and (iv) a transmission timing interval (TTI) count;

in the settling state, incrementing the TTI count until the product of the TTI count and the length of TTI is greater than the inner loop settling time;

in a transient state, adjusting the target SIR based on the occurrence of a cycle redundancy check (CRC) and at least one step size parameter; and

in a steady state, adjusting the target SIR based on a CRC and at least one step size parameter.

2. The method of claim 1 further comprising using the step size parameter to determine a convergence speed to the target SIR.

3. The method of claim 1 further comprising decrementing the SIR target using a step down parameter in the transient state.

4. The method of claim 3 wherein the step down parameter is equal to the product of a block error rate (BLER) and the step size.

5. The method of claim 1 further comprising incrementing the SIR target using a step up parameter in the transient state.

6. The method of claim 5 wherein the step up parameter is equal to the difference between the step size and the step down parameter.

7. The method of claim 1 further comprising decrementing the SIR target using a step down parameter in the steady state.

8. The method of claim 7 wherein the step down parameter is equal to the product of a block error rate (BLER) and the step size.

9. The method of claim 8 wherein the step down parameter is equal to the product of 2*BLER and the step size.

10. The method of claim 1 further comprising incrementing the SIR target using a step up parameter in the steady state.

11. The method of claim 10 wherein the step up parameter is equal to the difference between the step size and the product of a block error rate (BLER) and the step size.

12. The method of claim 1 further comprising setting the target SIR to the previous target SIR + (step up)* N_e – (step down)*(N_b - N_e), wherein N_b is the number of transport blocks per TTI, N_e is the number of CRC errors per TTI, (step up) is a parameter used to increment the target SIR and (step down) is a parameter used to decrement the target SIR.

13. The method of claim 1 further comprising setting the target SIR to the previous target SIR – (step down)*(N_b), wherein N_b is the number of transport blocks per TTI and (step down) is a parameter used to decrement the target SIR.

14. A wireless communication system for controlling transmission power to adjust the step size of a target signal-to-interference ratio (SIR) to compensate for channel conditions affected by block error rate (BLER), the system comprising:

means for initializing, in a settling state, a plurality of parameters including (i) an inner loop settling time, (ii) a steady state step size, (iii) a transient state step size and (iv) a transmission timing interval (TTI) count;

means for incrementing, in the settling state, the TTI count until the product of the TTI count and the length of TTI is greater than the inner loop settling time;

first means for adjusting, in a transient state, the target SIR based on the occurrence of a cycle redundancy check (CRC) and at least one step size parameter; and

second means for adjusting, in a steady state, the target SIR based on a CRC and at least one step size parameter.

15. In a wireless communication system, a method of controlling transmission power to adjust the step size of a target signal-to-interference ratio (SIR) to compensate for channel conditions affected by block error rate (BLER), the method comprising:

initializing a plurality of parameters including (i) an inner loop settling time, (ii) a first step size, (iii) a second step size and (iv) a transmission timing interval (TTI) count;

incrementing the TTI count until the product of the TTI count and the length of TTI is greater than the inner loop settling time;

adjusting the target SIR based on the occurrence of a cycle redundancy check (CRC); and

adjusting the target SIR based on a CRC.

16. The method of claim 15 further comprising using a step size parameter to determine a convergence speed to the target SIR.

17. The method of claim 15 further comprising decrementing the SIR target using a step down parameter.

18. The method of claim 17 wherein the step down parameter is equal to the product of a block error rate (BLER) and the step size.

19. The method of claim 15 further comprising incrementing the SIR target using a step up parameter.

20. The method of claim 19 wherein the step up parameter is equal to the difference between the step size and the step down parameter.

21. The method of claim 15 further comprising decrementing the SIR target using a step down parameter.

22. The method of claim 21 wherein the step down parameter is equal to the product of a block error rate (BLER) and the step size.

23. The method of claim 22 wherein the step down parameter is equal to the product of 2*BLER and the step size.

24. The method of claim 15 further comprising setting the target SIR to the previous target SIR + (step up)* N_e – (step down)*(N_b - N_e), wherein N_b is the number of transport blocks per TTI, N_e is the number of CRC errors per TTI, (step up) is a parameter used to increment the target SIR and (step down) is a parameter used to decrement the target SIR.

25. The method of claim 15 further comprising setting the target SIR to the previous target SIR – (step down)*(N_b), wherein N_b is the number of transport blocks per TTI and (step down) is a parameter used to decrement the target SIR.

26. A wireless communication system for controlling transmission power to adjust the step size of a target signal-to-interference ratio (SIR) to compensate for channel conditions affected by block error rate (BLER), the system comprising:

means for initializing a plurality of parameters including (i) an inner loop settling time, (ii) a first step size, (iii) a second step size and (iv) a transmission timing interval (TTI) count;

means for incrementing the TTI count until the product of the TTI count and the length of TTI is greater than the inner loop settling time;

first means for adjusting the target SIR based on the occurrence of a cycle redundancy check (CRC); and

second means for adjusting the target SIR based on a CRC.

AMENDED CLAIMS

[Received by the International Bureau on 17 december 2003 (17.12.03);
new claims 27-44 added (5 pages)]

27. A method of transmission power control for a wireless transmit receive unit (WTRU) that transmits data signals in a forward channel where the WTRU is configured to make forward channel power adjustments as a function of target metrics computed based on the data signals as received over the forward channel, the method comprising:

receiving data signals from the WTRU on the forward channel;

computing target metrics for the WTRU's forward channel power adjustments based on the detection of predetermined error conditions in the signals received on the forward channel including:

setting an initial target metric value;

after a preliminary period at the initial value, changing the target metric by a step up or a step down amount at time intervals of a predetermined length whereby the target metric is increased by the step up amount if a predetermined error condition has been detected in an immediately preceding time interval or is decreased by the step down amount if the predetermined error condition has not been detected the immediately preceding time interval; and

setting the step up and step down amounts at a first relatively high transient state level and reducing the step up and step down amounts by a selected amount if a predetermined error condition has been detected in an immediately preceding time interval until they are reduced to a second relatively low steady state level.

28. The method of claim 27 wherein the computing target metrics further includes increasing the step up and step down amounts by a selected amount if a predetermined error condition has not been detected in a predetermined number of time intervals while they are set at the second relatively low steady state level.

29. The method of claim 27 in which the target metrics are target signal to interference ratios (SIRs) and cyclic redundancy checks are conducted to detect the predetermined error condition.

30. The method of claim 29 wherein step up amounts are significantly greater than respective step down amounts, the first level of step up and step down amounts are a factor of 2^n greater then the second level of step up and step down amounts, where n is a positive integer, and the step up and step down amounts are reduced by a factor of 1/2 if a predetermined error condition has been detected in an immediately preceding time interval until they are reduced to the second level.

31. The method of claim 30 wherein the computing target metrics further includes increasing the step up and step down amounts by a factor of 2 if a predetermined error condition has not been detected in a predetermined number of time intervals while they are set at the second relatively low steady state level.

32. The method of claim 30 wherein the computing target metrics further includes increasing the step up and step down amounts to the first level if a predetermined error condition has not been detected in a predetermined number of time intervals while they are set at the second relatively low steady state level.

33. The method of claim 29 wherein the WTRU is a network unit that transmits user signals on a downlink channel and the computing of target metrics is performed by a WTRU that receives the downlink channel.

34. The method of claim 29 in which closed loop transmission power control for the WTRU is implemented further comprising:

producing power step commands as a function of the computed target SIRs and transmitting the power step commands on a reverse channel; and

receiving the power step commands by the WTRU on the reverse channel and computing power adjustments for forward channel transmissions based on the received power step commands.

35. The method of claim 34 wherein the method is implemented in a third generation partnership program (3GPP) wideband code division multiple access (W-CDMA) system where the WTRU is a network unit that transmits user signals on a downlink channel and the computing of target metrics is performed by a WTRU that receives the downlink channel and produces power step commands that are transmitted to the network unit on an uplink channel.

36. A receiving wireless transmit receive unit (WTRU) for implementing transmission power control for a transmitting WTRU that transmits data signals in a forward channel where the transmitting WTRU is configured to make forward channel transmission power adjustments as a function of target metrics computed by the receiving WTRU, the receiving WTRU comprising:

a receiver for receiving data signals from a transmitting WTRU on a forward channel;

a processor for computing target metrics for implementing forward channel transmission power adjustments in the transmitting WTRU based on the detection of predetermined error conditions in the data signals received on the forward channel; and

said processor configured to compute target metrics such that:

after a preliminary period at an initial value, the target metric is changed by a step up or a step down amount at time intervals of a predetermined length whereby the target metric is increased by the step up amount if a predetermined error condition has been detected in an immediately preceding time interval or the target metric is decreased by the step down amount if the predetermined error condition has not been detected in the immediately preceding time interval; and

the step up and step down amounts are set a first relatively high transient state level and are reduced by a selected amount if a predetermined

error condition has been detected in an immediately preceding time interval until they are reduced to a second relatively low steady state level.

37. The invention of claim 36 wherein said processor is further configured to compute target metrics such that the step up and step down amounts are increased by a selected amount if a predetermined error condition has not been detected in a predetermined number of time intervals while they are set at the second relatively low steady state level.

38. The invention of claim 36 in which the target metrics are target signal to interference ratios (SIRs) and the receiving WTRU is configured to conduct cyclic redundancy checks to detect the predetermined error condition.

39. The invention of claim 38 wherein said processor is configured to compute target metrics such that step up amounts are significantly greater than respective step down amounts of a given level, the first level of step up and step down amounts are a factor of 2^n greater then the second level of step up and step down amounts, where n is a positive integer, and the step up and step down amounts are reduced by a factor of 1/2 if a predetermined error condition has been detected in an immediately preceding time interval until they are reduced to the second level.

40. The invention of claim 39 wherein said processor is further configured to compute target metrics such that the step up and step down amounts are increased by a factor of 2 if a predetermined error condition has not been detected in a predetermined number of time intervals while they are set at the second relatively low steady state level.

41. The invention of claim 39 wherein said processor is further configured to compute target metrics such that the step up and step down amounts are increased to the first level if a predetermined error condition has

not been detected in a predetermined number of time intervals while they are set at the second relatively low steady state level.

42. The invention of claim 38 where the transmitting WTRU is a network unit that transmits user signals on a downlink channel wherein the receiving WTRU is configured to compute target metrics based on the detection of predetermined error conditions in the data signals received on the downlink channel.

43. The invention of claim 38 in which closed loop transmission power control for the transmitting WTRU is implemented wherein the receiving WTRU processor is further configured to produce power step commands as a function of the computed target SIRs and the receiving WTRU further comprising a transmitter configured to transmit the power step commands on a reverse channel to the transmitting WTRU.

44. The invention of claim 43 which is implemented for use in a third generation partnership program (3GPP) wideband code division multiple access (W-CDMA) system where the transmitting WTRU is a network unit that transmits user signals on a downlink wherein the receiving WTRU is configured to compute target metrics based on the detection of predetermined error conditions in the data signals received on the downlink channel.